Annales Médico-Psychologiques 178 (2020) 624–631

Available online at ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com

Report

An investigation on Negative Activity, Alexithymia, Emotion Regulation, and Internet addiction in a sample of high school students: A randomized controlled trial

Enquête sur l'activité négative, l'alexithymie, la régulation des émotions et la dépendance à Internet chez un échantillon d'élèves du secondaire: un essai contrôlé randomisé

Mohammad Ahsan Khodami [a,*], Leila Sheibani [b]

[a] *Neuroscience researcher, Sanandaj, Kurdistan, Iran*
[b] *Psychology and Educational Research, Shiraz, Fars, Iran*

ARTICLE INFO

Article history:
Received 23 July 2019
Accepted 2 October 2019
Available online 26 November 2019

Keywords:
Alexithymia
Emotion Regulation
Highschool Students
Internet Addiction
Negative activities

ABSTRACT

This research was conducted on students that studying in high schools in Sanandaj city, Kurdistan Province, Iran. In total, 743 students were selected from all of the interested students, and then participants completed a sociodemographic questionnaire, the Internet Addiction Test (IAT), Negative Activities test (DASS-21), Emotion Regulation test (ER), and Farsi Toronto Alexithymia test (FTAS-20). In total, 287 students marked as moderate and severe addicted users. Among all 287 students, 243 students agreed to attend the rest of the tests (Main group). Also, 137 students are selected as control group. The study shows that IA score is associated with NA, ER, and alexithymia scores. Students with high scores in IA showed higher scores on the other test. Although we could not find any correlation between some subscales, still the research indicates that most addicted users are involved with the other psychological impairments. Clinical results were discussed.

© 2019 Elsevier Masson SAS. All rights reserved.

Mots clés :
Activités négatives
Addiction à Internet
Alexithymie
Élèves du secondaire
Régulation des émotions

RÉSUMÉ

Cette recherche a été menée sur des étudiants de lycées de la ville de Sanandaj, dans la province du Kurdistan, en Iran. Parmi eux, 743 ont été sélectionnés ; ils ont rempli un questionnaire sociodémographique, le test *Internet Addiction Test* (IAT), le test des activités négatives (DASS-21), le test de régulation des émotions (ER) et le test *Farsi Toronto Alexithymia* (FTAS-20). Deux cent quatre-vingt-sept étudiants sont toxicomanes modérés et sévères. Sur ces 287 étudiants, 243 ont accepté de participer aux autres tests (groupe principal). De plus, 137 étudiants ont été sélectionnés comme groupe de contrôle. L'étude montre que le score IA est associé aux scores NA, ER et alexithymie. Les étudiants avec des scores élevés en IA ont montré des scores plus élevés. Bien que nous n'ayons pu trouver aucune corrélation entre certaines sous-échelles, la recherche indique néanmoins que la plupart des utilisateurs toxicomanes montrent d'autres déficiences psychologiques. Les résultats cliniques sont discutés.

© 2019 Elsevier Masson SAS. Tous droits réservés.

1. Introduction

Modern communication technologies present the chance of synchronous and unlimited communication among individuals, despite the place they belong to it. The Internet is becoming

* Corresponding author: Cognitive Neuroscience, Sanandaj, Kurdistan, Iran.
E-mail address: ahsan.khodami@gmail.com (M.A. Khodami).

https://doi.org/10.1016/j.amp.2019.10.007
0003-4487/© 2019 Elsevier Masson SAS. All rights reserved.

widespread every day. Inquiries and researches in the United States of the age of users which using the Internet show that 95% of the youths people about 14 and 17, 95% of young with the age range of 18 and 29 are frequently using the Internet. Meanwhile, another study in Turkey presented that 29% of the teen's ages 14–17 (24% of the boys, 34% of the girls) have access to the Internet typically on their cell and smartphones [24]. Despite several benefits of the Internet, using the Internet for so many hours as a primary mean of engaging, easing negative activity, the problem in most of the psychological areas which can be a sign of psychological impairments. Life-threatening of Internet usage is also related to some physical and mental health and plays an important rule on social issues like sleeping problems [29] depression [7] relationships [20], moreover, causes a reduction in most of the levels and tasks of the work, school, and even personal's life's performances [20]. Many other records of researches exposed that alexithymia, lack of skills of controlling emotion regulation, and impulsiveness are the most significant factors for the development, increase, and maintenance of addiction-related problems. Although the Internet is represented as one of the behavioral impairments and these psychological phenomena are important in the studies of the behavioral addiction, there are not enough studies that investigating the relationship about the Internet addiction and these concepts. Nowadays, in the latest researches, there are just a few studies which converging independently on alexithymia, emotion regulation, and negative activities. As the main aim, This study aims to bring mentioned psychological factors together to focus then expand the view of excessive Internet use as a behavioral addiction.

Students are constantly looking for progress as growing and making progress in their different aspects of life is mostly Inevitable. Internet as a useful communication tool can help them to increase their scientific ability, having more communication with others, etc. However, students, like other parts of society, are not protected to the addiction to the Internet and are at risk. Today, most people in the world are using the Internet, in a survey in 2017, about 40% of the people are online [17,35]. One study found that the maladaptive use of the Internet caused meaningful discomfort and clinical disorder and that the prevalence in the age of 15–19 years was more and more than the other ages [41]. Many other pieces of research have also shown that Internet addiction can cause harmful psychological and behavioral effects in adolescents such as anxiety and depression [16,38,40]. There are numerous causes to hypothesize a relationship between alexithymia, Negative activities, Emotion Regulation, and Internet addiction severity in high school students. It has also been proposed that the Internet may be an excellent atmosphere for people who have troubles in establishing relationships, because of the absence of physical presence and proximity together with the lack of the direct observation of others; these hallmarks may allow the Internet communicators to reach greater control over the communication process [26]. As the main aim of this study, we are going to find a relationship between moderate and severity of the Internet addiction, Negative activities (Including stress, anxiety, and depression), Emotion Regulation (ER), and Alexithymia.

Negative activities (Anxiety, stress, and depression) are among the most critical issues of behavioral science, and according to global statistics, 35% of all mental disorders are mood disorders, most of them from childhood and adolescence. A study in Turkey on 303 Turkish students showed that 6.6% of students had severe Internet addiction and anxiety disorders were also higher in these individuals as well as irritability, anxiety, emotional disturbances and behavioral problems with addiction to The Internet has had a positive and significant correlation [31]. In another study, Rocco Zoccali et al. have shown that high school students with levels of Internet addiction have a significant relationship with the Alexithymia score, and students with high scores in online addiction have been positively correlated with alexithymia [37]. Alexithymia is problem in self-regulation and failure to cognitive processing of emotional information [32]. Alexithymia is a multidimensional, imaginative, difficulty in explaining or addressing feelings, problem in identifying feelings of physical perception and surrounding and external event [41]. Research evidence shows that alexithymia plays a clear role in the addictions [21].

Beyond psychosomatic and somatoform disorders, alexithymia has also been associated with addictive disorders, such as pathological gambling, Smartphones, and social media addiction [33,43], substances and alcohol abuse and dependence [12,34] and eating disorders [39,42,48]. The possible explanation for the mentioned association is that alexithymic individuals may try to self-regulate emotional states through addictive behaviors [40]. Recent research has found a relationship within alexithymia and Internet addiction amongst the University students [9,11,12,37,46]. Main conclusions have revealed that the Difficulty in Identifying Feelings subscale of the Toronto Alexithymia Scale-20 (TAS-20) was correlated with higher risk of Internet addiction [11,37,46]. Moreover, alexithymia partially mediated the relationship between early experiences of child violation and problematical Internet use [37,46].

Although there are studies which revealed that alexithymia, emotion regulation, Negative activities, and Internet Addiction:

- the relationships of Internet Addiction, Negative activities, emotion regulation, and Alexithymia, among addicted or non-addicted students, have not been studied yet;
- it remains unclear whether Moderate and severe Internet-addicted students will obtain high-score in all Negative activities, Emotion Regulation, and Alexithymia.

This study aims to find a correlation between the role of some psychological factors, which are found related to Internet Addiction and behavioral factors on internet addiction. Reports showed that individuals with a high score in alexithymia, who have difficulty identifying personal emotional states, and a limited ability to communicate these feelings to others, result in the strain and inability to effectively manage emotions. Additionally, limited ability to deal appropriately with affective states may lead people to engage with impulsive actions or compulsive behaviors, rather than reasonably planned activities, to regulate distressing emotional states. Although anxiety and depression are phenomenologically separated, it has established very difficult to distinguish between these constructs by empirical means either using clinicians' ratings or self-report tests. Also, we want to find that students with high-level of Internet Addiction and Alexithymia show negative activities and are they involved with factors of negative activities or not. At this moment, in this study, we follow these main questions and hypothesis that:

- students with high scores (moderate and severe addicted users) of Internet addiction are more involved with Alexithymia;
- students with high-scores of Internet addiction have problems in controlling their Emotion Regulation;
- moreover, finally, students which are involved with high scores of Internet addiction has high-score in the case of Negative Activities.

2. Method

2.1. Participants

This research was conducted on the level of boys and girls that they are studying in high schools in Sanandaj city, Kurdistan

Province, Iran. Sampling was selected randomly from the students of the first year (10th grade), the second year (11th grade), the third year (12th grade) and the fourth year (pre-university). It is important to mention that the average age of high school students in Iran is about 14–19 years old. Because of some restrictions applied by the families, usually, students in the age of under 16 do not have full access to the internet or the number of users is not enough to participate in the research. In case of access to valid data, we asked the students with a minimum age of 16 and have free access (without parent's restriction) to the internet to participate in our first step of this research.

2.2. Procedure

At first, the procedure was explained at a meeting with the full-time teaching staff, and then all ethics, rules, and essential rules have explained to the students in a meeting. Then, 743 students were selected from all of the interested students, and then they participated in the first test Of the Internet Addiction (IAT). At the end of the first test, results checked. In the number of the 743 students who participated in the first stage, 287 students obtained a score of 59 to 100. Based on the criteria, moderate-level is score 50–79, and severe level 80 to 100. Also, 219 students marked as the mild level of Internet addiction ranging with a total score of 31 to At the end of the first stage, after determining the students with moderate and severe levels of addiction, we asked them to participate in the next tests. In the next step, we invited all 287 moderate and severe users to participate in another meeting to accept to participate in the other tests. Among all 287 students, 265 students accepted our invitation to the second meeting, and among the participants in the second meeting, 243 students agreed to attend the rest of the tests.

In the case of the Control group, as shown in Table 1, after checking the scores, 465 students scored as normal and mild users. We invited 250 students to the second phase of the research, and 189 students accepted our invitation for the meeting, and finally, 137 (54.8% of the total of invited student for the second phase of the research meeting) accepted to continue cooperation with us.

For this purpose, at each stage of the test, before each one of the tests, the students were fully described how to hold and respond, and then they were asked to do the tests. At this stage, students have done DASS-21, 20 items Farsi Toronto Alexithymia (FTAS-20) Test, and Emotion Regulation (ERQ) Test. Before finishing the tests, we asked the students also to provide demographic data include the participant age, level of the study, Family's main job, and the reason for using the internet.

In order to ease the responsiveness and uncertainty in responding to the tests, several volunteers reviewed the students and made comments about the comprehensibility of the tests. Also, in order to avoid ambiguity during the testing for participants during the time of the test, a psychologist guided the students in case of having a question, problem in understanding the question, etc. Fig. 1 shows the process steps.

2.3. Questionnaires

2.3.1. Demographic Questionnaire

To access more information about all the participant in this research, we asked participants to provide basic knowledge about their family which was about their supporter parent's job? (own jobs, Official/government jobs, Academic jobs, and Retired and the other jobs). Also, we asked about the main reason for using the Internet as activity? The answers were Research/Academic using, Chat/communication, Online gaming, and Other. All provided information is available in Table 1.

2.3.2. Internet Addiction test (IAT)

The Internet Addiction Test known as IAT [47] is a 20-item questionnaire to evaluvate the presence and severity of Internet dependency. The IAT is designed by Dr. Young to measure signs of addiction and excessive using in a variety of different participants. The IAT shows the excessive using based on a self-reported compulsive using of Internet in the a vraity of ages of participants. In case of better diagnosis, results of the test is better to be estimated with attention between clinical groups of participants with specific psychological imapirments and participants with compulsive diagnostics. The test was designed by changing DSM-IV criteria for gambling, and it is an edited form of the first eight items scale of Young's IA Diagnostic Questionnaire (IADQ). The IAT spots addiction as an impulse-control disorder, it is important to know that the term Internet is valid for all types of online activities. This Measure is the most broadly used IA scale, and the test has

Table 1
Statistical and descriptive of demographic data of the participants.

Factor	Moderate and Severe addicted users			Control Group		
	Total (*N* = 243) *N* (%)	Males (*N* = 126) *N* (51.9)	Females (*N* = 117) *N* (48.1)	Total (*N* = 137) *N* (%)	Males (*N* = 68) *N* (49.6)	Females (*N* = 69) *N* (50.4)
Age (years)						
16	74 (30.5)	38 (15.6)	36 (14.8)	35 (25.5)	20 (14.6)	15 (10.9)
17	42 (17.3)	20 (8.2)	22 (9.1)	43 (31.4)	25 (18.2)	18 (13.1)
18	61 (25.1)	36 (14.8)	23 (10.3)	29 (21.2)	13 (9.5)	16 (11.7)
19	66 (27.2)	32 (13.2)	34 (48.1)	30 (21.9)	10 (7.3)	20 (14.6)
School grade						
10th	57 (23.5)	27 (11.1)	30 (12.3)	29 (21.2)	9 (6.6)	20 (14.6)
11th	61 (25.1)	36 (14.8)	25 (10.3)	34 (24.8)	17 (12.4)	17 (12.4)
12th	59 (24.3)	29 (11.9)	30 (13.2)	34 (24.8)	21 (15.3)	13 (9.5)
Pre-University	66 (27.2)	34 (14.0)	32 (13.2)	40 (29.2)	21 (15.3)	19 (13.9)
Activity's reason						
Research/Academic	60 (24.7)	37 (15.2)	23 (9.5)	36 (26.3)	22 (16.1)	14 (10.2)
Chat/communication	68 (28.0)	34 (14.0)	34 (14.0)	21 (15.3)	9 (6.6)	12 (8.8)
Online Gaming	54 (22.2)	21 (8.6)	33 (13.6)	44 (32.1)	17 (12.4)	27 (19.7)
Other	61 (25.1)	34 (14.0)	27 (11.1)	36 (26.3)	20 (14.6)	16 (11.7)
Family's Main Job						
Own Job	55 (22.6)	28 (11.5)	27 (11.1)	40 (29.2)	19 (13.9)	21 (15.3)
Official Job	57 (23.5)	35 (14.4)	22 (9.1)	33 (24.1)	19 (13.9)	14 (10.2)
Academic	45 (22.2)	27 (11.1)	27 (11.1)	15 (19.0)	11 (8.0)	15 (10.9)
Retired/Other	77 (31.7)	36 (14.9)	41 (16.9)	19 (27.7)	19 (13.9)	19 (13.9)

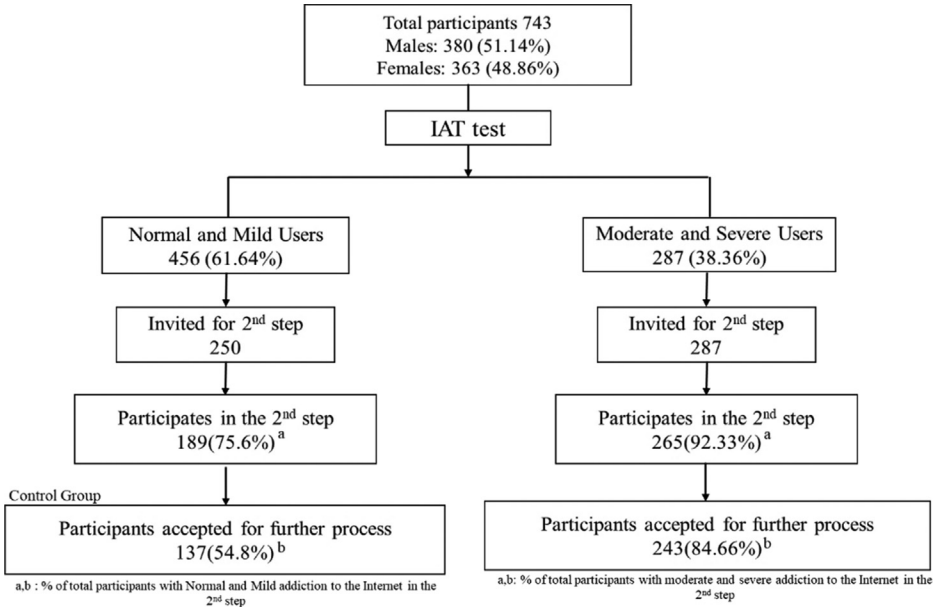

Fig. 1. The process steps.

been translated into several languages, such as English, Chinese, Farsi, and other languages [8]. In Sweden and Korea, the Cronbach's alpha was more than 0.09, and in the validity and reliability of this questionnaire in Iran, Cronbach's alpha was 0.88 [31].

2.3.3. The Negative Activity test (DASS-21)

It is a short form of Lovibond and Lovibond's (1995) 42-item self-report measure of depression, anxiety, and stress (DASS). Brown et al. [6] have proposed that the subscales of the DASS-21 may measure the three dimensions defined in the tripartite form; low PA (DASS-Depression), physiological hyperarousal (DASS-Anxiety), and NA (DASS-Stress) which is a short form of Lovibond and Lovibond's (1995) 42-item self-report measure of depression, anxiety, and stress (DASS-21) [6]. It has been stated that this is because most current self-report scales for anxiety and depression mostly cover the primary factor of negative affectivity [44]. Negative Activity is imagined as a dispositional scale where high results of Negative activity reveals the experience of mental distress and unpleasurable combat, and low rates of the test indicate the absence of these feelings. In Iran, the reliability of this scale has been reported in a sample of 400 people for depression, 0.70 for anxiety 0.66 and stress 0.76; also, the internal stability scale was measured by Cronbach's alpha for depression, 0.94 for anxiety 0.92, and Stress reported 0.89 [3,28]. In the present sample, the Cronbach's alpha for depression, 0.91 for anxiety 0.90, and for Stress reported 0.94.

2.3.4. Farsi version of Toronto Alexithymia Scale (FTAS-20)

Alexithymia was measured by using the Farsi version of the Toronto Alexithymia Scale (FTAS-20) [5,37]. The FTAS-20 consists of 20 items on a five-point Likert scale, assessing the different aspects of alexithymia. participants are considered as showing levels of alexithymia if their score is 61 or above. The FTAS-20 Scale has a three-factor structure congruent with the concept of alexithymia: difficulty identifying feelings (DIF), difficulty expressing feelings (DEF), and externally oriented thinking (EOT). A confirmatory factor analysis showed the same factor structure as the original English version and adequate internal consistency of the subscales, with α coefficients equal to or greater than 0.70 [13,39]. The Farsi Toronto Alexithymia Scale-20 (FTAS-20) [4,13] is a 20-item Persian version of the Toronto Alexithymia Scale (TAS-20) [13,14] validated for the Iranian populations [4,13]. The Cronbach's alpha of the FTAS-20 was 0.83 for substance dependent patients [4,13]. In the present sample, the Cronbach's alpha of the FTAS-20 was 0.67.

2.3.5. The Emotion Regulation Questionnaire [13,15]

It is a 10-item scale that measures reappraisal (6 items) and suppression (4 items) subscales. We applied the Persian version of ERQ [7,13]. The Cronbach's alpha for the Persian version of ERQ was 0.71 [1]. In the study, the Cronbach's alphas for reappraisal and suppression were 0.82 and 0.76 respectively.

2.4. Statistical Analyses

Different Chi^2 tests were performed to examine possible meaningful relationships between categorical variables. Also, a descriptive statistic of the Internet Addiction, Negative Activities, Emotion Regulation, and FTAS-20 test scores were executed in order to determine mean and SD in both control group and Moderate and Severe addicted users. The reliabilities of the applied scales were evaluated using Cronbach's alpha. Also, a Binary forward regression has been executed In order to predict the prevalence of Negative activities, Emotion Regulation, and Alexithymia among moderate and severe addicted users. All Statistical data analysis was performed with SPSS v24.0 for Windows.

3. Results

The demographic data and prevalence portion of Internet addiction and alexithymic students are shown in Table 1. As the table shows students at the age of 16 has higher rate of addiction to the Internet, In the second-place students in Pre-University level. Also, the table shows that students that their parents are working in Academic jobs have a moderate level of addiction to the Internet. Also, Chat and communication are ranked in the first place of using the Internet for moderate and severe addicted students. In case of the gender specification, Male students have higher level of addiction to the Internet. According to the IAT cut-off score, 96 Males (76.2 of total) and 75 females (30.9% of total) are marked

as Moderate users, and 30 males (32.8%) and 42 females (17.3%) are marked as severe users ($\chi^2 = 4.251$, df = 1, $P = 0.39$). descriptive statistics based on the level of education and level of addiction to the Internet statistics show that 171 students (70.4) are moderate users and 72 students (29.6) are severe users ($\chi^2 = 0.228$, df = 3, $P = 0.973$).

The Table 2 shows data for Moderate and severe addicted student's data based on education level. Based on data, the main group of our research (Moderate and severely addicted users) in all of the tests have higher level, and the control group does not have any high level respected to the main group. This shows that basically, students with higher levels of addiction to the Internet are more involved with more mental problems and psychological impairments. These statistics can confirm that Internet addiction can be comorbid with other Psychological disorders. Also, as the results show in Table 2, students that are normal and mild users are less involved with negative reactions such as stress, depression, difficulty in the emotion regulation and Alexithymia.

Also, as it can be displayed in Table 3, in case of total scores as mentioned earlier, students in the main group obtained higher total score in all tests in compare with control group that this shows that higher level of addiction to the internet can cause more scores in Negative activities, Emotion Regulation, and Alexithymia.

The Table 4. shows the Pearson correlation to test the correlation of all scale and subscales with Internet Addiction. Pearson's correlations demonstrated a significant relationship between students with moderate and severe addiction to the Internet, Stress, Emotion Regulation, and Identifying feelings. Also, this table does not show any significant correlation between Anxiety and Difficulty in Express feelings. In a closer view, the table shows that correlation between Internet Addiction and Externally Oriented thinking is negative.

Also, as Table 4 shows all the other aspects are significantly correlated together which shows that despite having no correlation between Internet addiction and Anxiety, and Identifying feelings; still all the other aspects are correlated as well. Also, we find out that students with negative activities have high scores in their emotion regulation and alexithymia.

The Table 5 shows a binary logistic regression to predict Emotion Regulation, Alexithymia, and Negative activities prediction based on Internet Addiction range (which applied on the Severity and moderate users). These factors predicted the range for 66.3% and 77.8% for Emotion Regulation and Alexithymia and 66.7% negative activities for users with moderate and severe addiction to the internet. As we predicted user with high range of Internet addiction is more involved with the other factors.

4. Discussion

This investigation aimed to investigate on the main hypothesis that students with moderate, and severe addiction to the internet will obtain high scores in all other levels of Negative activities (including Depression, Stress, and Anxiety); Emotion Regulation, and Alexithymia. Our findings show that students with high level of addiction to the Internet are more involved with the other aspects of psychological and behavioral, also cognition problems. So The first hypothesis of this study was verified. Furthermore, regression analyses showed that Internet Addiction was a significant predictor of Negative activities, Emotion Regulation, and Alexithymia, Consistent with previous studies [19,37,45]. Our results also suggest the range of IAT can be used as a good predictor of Negative activities, problems in the Emotion Regulation and Alexithymia. The conclusions of this study continue previous data, and all are showing an association between alexithymia and Internet addiction severity in adult populations [10,11,37,46]. Users of the Internet by using the internet are trying to make a cover or be hidden behind an unknown person which shows that these users have difficulty in developing healthy and intimate social relationships because of their weakness to identify and regulate emotional states correctly. Also, other studies show that individuals with alexithymic symptoms show the same reaction [37]. Which this is a significant reason why users with moderate and severe addiction to the internet have high score of alexithymia total score. This study hypothesized that because of using an unknown identity on the time of using the internet, using that makes a comfortable and confidence to the users to make better and easier relationships.

Table 2
Descriptive statistics of the Internet Addiction, Negative Activities, Emotion Regulation, and FTAS-20 test scores.

Factors	Moderate and Severe Addicted Users	Control Group
	Total ($N = 243$) M (SD)	Total ($N = 137$) M (SD)
IAT	74.75 (8.80)	37.91 (7.10)
Negative Activities	51.75 (9.89)	18.77 (8.48)
Depression	18.40 (3.60)	6.63 (2.83)
Stress	17.08 (4.24)	6.02 (3.10)
Anxiety	16.28 (3.28)	6.12 (2.85)
Emotion Regulation	55.30 (10.41)	44.80 (12.97)
Reappraisal	33.87 (6.37)	16.41 (6.37)
Suppression	21.43 (5.13)	28.39 (8.40)
FTAS-20	62.55 (13.74)	30.09 (8.66)
Identifying feeling	22.07 (4.23)	15.01 (3.08)
Express feeling	18.25 (3.21)	10.07 (2.69)
Externally Oriented thinking	22.23 (8.70)	5.01 (3.08)

Table 3
Descriptive statistics of internet addiction test scores by the other tests (based on total score).

Factors/*N*	Total ($N = 380$) M (SD)	Main Group ($N = 243$) M (SD)	Control Group ($N = 137$) M (SD)
Internet Addiction	61.47 (19.52)	74.75 (8.802)	37.91 (7.10)
Negative Activities	39.86 (18.43)	51.75 (9.89)	18.77 (8.48)
Emotion Regulation	51.51 (12.45)	55.30 (10.41)	44.80 (12.97)
Alexithymia	50.85 (19.77)	62.55 (13.74)	30.09 (8.66)

Table 4
Partial correlations between Internet Addiction, negative activity, emotion regulation, and alexithymia in moderate and severe Internet addicted users ($N = 243$).

	IAT	Depression	Stress	Anxiety	Reappraisal	Suppression	DIF	DEF	EOT
IAT	–								
Depression	0.084	–							
Stress	0.232[a]	0.723[a]	–						
Anxiety	0.091	0.808[a]	0.880[a]	–					
Reappraisal	0.423[a]	0.773[a]	0.757[a]	0.686[a]	–				
Suppressing	0.181[a]	0.813[a]	0.639[a]	0.701[a]	0.633[a]	–			
DIF	0.232[a]	0.720[a]	0.998[a]	0.883[a]	0.756[a]	0.641[a]	–		
DEF	0.108	0.820[a]	0.887[a]	0.989[a]	0.715[a]	0.715[a]	0.885[a]	–	
EOT	−0.251[a]	0.418[a]	0.461[a]	0.477[a]	0.303[a]	0.407[a]	0.460[a]	0.479[a]	–

IAT: Internet Addiction Test; DIF: Toronto Alexithymia Identifying feeling; DEF: Toronto Alexithymia Difficulty in Express feeling; EOT: Toronto Alexithymia Externally Oriented thinking.
[a] Correlation is significant at the 0.01 level (2-tailed).

Table 5
Forward conditional logistic regression analysis to predict Internet Addiction outpatients.

Factors	B	S.E.	Wald	df	Exp (B)	95% C.I for EXP (B)		P
						Lower	Upper	
Emotion	0.085	0.016	29.060	1	1.089	1.056	1.123	$P < 0.001^{**}$
Regulation Alexithymia	−0.101	0.018	30.134	1	0.904	0.872	0.937	$P < 0.001^{**}$
Negative activities	0.043	0.014	9.129	1	1.044	1.015	1.074	$P < 0.001^{**}$

Summary: −2 Log likelihood = 286.004; Nagelkerke R2: 0.54; Overall percentage of correct classification resulting from the model: 66.7%. $^{**}P < 0.001$.

Although most of the users in this study showed high-level of negative activities which can be assumed that students by using the internet trying to overcome their stress, anxiety, and depression [2,18]. As mentioned before, having an unknown identification is used to have better regulation of emotions during social communications and as a way to make a better relationship. Most of the studies showed that internet addicted users have problem with controlling their emotion regulation [2]. Moreover, this can be confirmed that gender, level of study, and also the age are not practical factors and this can happen at any age, level of education, and gender.

Another study showed that users with high-level of addiction are more like to be alone, and are more associated with psychological impairments [30]. Result of this research can confirm our hypothesis that Addicted students are also are in the same criteria and this is a good reason to have problem in Alexithymia scales. It has been hypothesized that associates with alexithymia who have struggle in recognizing, expressing, and describing emotions may overuse Internet as a mechanism of social communication to better manage their emotions and to satisfy their unmet social demands. Furthermore, an increasing body of proof suggests that alexithymia may also play an essential role in the etiopathogenesis of addictive disorders [23,25,37]. Also, it can be confirmed that also students with high levels of addiction have the same behavior which this did not happen in the users with normal and mild users. Whatever the explanation for this relationship, our results imply the importance of assessing possible Internet addiction drifts within high school students with the other psychological impairments. Internet addiction trait may be one of the several personality factors that predispose adolescents to the development of Stress, Depression, Anxiety, Emotion Regulation, and Alexithymia. Specifically, this research showed that using the internet is associated with lack of psychological and education counseling and this behavior needs a real control of the students. As the students are in their tender ages of development and because of the future, which they will go to the universities, starting work in the society, this can be used as a first step of controlling the other psychological impairments. Taking this funding may provide a new insight to control the other problems that students are more involved.

As this study shows, most of the addicted users are more involved with stress, and this can be caused because of the conditions of the schools and herewith causes other problems. We think that this funding can be used to have more consulate meeting with students, make the schools less-stressed environments and also define and solve argument(s) to the students that schools are the places to make a brightness future not standing with more stress. Although far from the main aim of this study, as Table 4 shows, there is a significant relationship between Negative activities and Emotion regulation and alexithymia (mostly +1 correlation between Difficulty in Express feeling and Identifying feeling); these show that stress, anxiety, and depression are the most influential factors which increasing problems. Unfortunately, the punishment system, an unhealthy competitive system of studying increased the level of negative activities, problem in controlling emotion, and subsequently high score of alexithymia problems are more overrated among students. This funding can be addressed as future planning to control these factors, and the same problems to make a more healthy future for the students.

Another important note in this study is about a positive correlation between the Internet addiction and Suppression in both of our groups (0.403 for the control group and 0.181 for main group "Correlation is significant at the 0.01 level (2-tailed)"). Positive correlation in both groups address this hypothesis that mostly all of the students are involved with this area, and this can be used in further researches.

This study has several limitations. The study sample consisted of high school students selected from a residential area of Kurdistan province in Iran: results would have been more convincing if the sample was more varied concerning age and cultural/socioeconomic variables. Also, we believe that the principal environment, system of study, reward and punishment system, and finally, cultural factors can change the results. A further limitation is that agreement has not yet been reached regarding the three-factor structure of the FTAS-20 and, individually, the EOT subscale of the FTAS-20 has shown negative

reliability. As another limitation Although the TAS-20 has been validated in different adolescent samples [22,27,36,37]. The three-factor of the TAS-20 did not perpetually take support in adolescents' because of age diversity in the factor construction, which this study also can confirm this. Finally, the psychometric evaluation was conducted by using self-report instruments: given that difficulty of self-reflexivity characterizes alexithymia and that self-report measures require self-reflection skills, the validity of our conclusions is not assured. Future research integrating the evaluation of alexithymia with observer reports is needed to replicate these conclusions.

5. Conclusion

As time passes, access to the internet is getting more comfortable than the past; there is no doubt that Internet is an important part of our life and using of the Internet is inventible, Internet Addiction is an increasing quandary in the field of pathological addictive behavior. Having better knowledge about the relationship between Internet addiction, Negative activities, Emotion Regulation, and Alexithymia lead us to a more profound conclusion of the etiology and pathogenesis of this addictive conduct, presenting new penetrations into the evolution of specific psychological and Also psychosocial approaches pointed at the prevention and remedy of Internet Addiction. This study showed that Internet addiction scores are associated with Negative activities, Emotion Regulation, and alexithymia scores in high school students. In particular, results show that most of the subscales in the three psychological factors were assessed correlate with Internet addiction.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

The study was carried out in accordance with the recommendations of Declaration of Helsinki and local ethical guidelines for studies with human participants with written informed consent from all subjects. The protocol for the study was approved by Research Ethics Committee at the Faculty of Pedagogy and Psychology of the University of Bialystok.

Funding

This work was part of a personal research working and was not supported by any funding institute and so forth.

Disclosure of interest

The authors declare that they have no competing interest.

References

[1] A, G., R, I., S, H. Psychiatric Properties of Emotion Regulation Questionnaire of Gross and John in an Iranian Sample. 6th Conference on Mental Health 2012;722–4.
[2] Akin A, Iskender M. Internet addiction and depression, anxiety and stress. International Online Journal of Educational Sciences 2011.
[3] Asad Z, Sayari R, Ebadi A, Sanainasab H. Abundance of Depression, anxiety and stress in Militant nurses (In Persian), Journal of Military Medicine; 2011;13(2):10–8.
[4] Besharat MA. Assessing Reliability and Validity of the Farsi Version of the Toronto Alexithymia Scale in a Sample of Substance-Using Patients. Psychological Reports 2008. http://dx.doi.org/10.2466/pr0.102.1.259-270.
[5] Bressi C, Taylor G, Parker J, Bressi S, Brambilla V, Aguglia E, et al. Cross validation of the factor structure of the 20-item Toronto Alexithymia Scale: An Italian multicenter study. J Psychosom Res 1996. http://dx.doi.org/10.1016/S0022-3999(96)00228-0.
[6] Brown TA, Chorpita BF, Korotitsch W, Barlow DH. Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. Behav Res Therap 1997. http://dx.doi.org/10.1016/S0005-7967(96)00068-X.
[7] Ceyhan E, Ceyhan AA, Gürcan A. The Validity and Reliability of the Problematic Internet Usage Scale. Educational Sciences: Theory & Practice 2007.
[8] Chin F, Leung CH. The concurrent validity of the internet addiction test (iat) and the mobile phone dependence questionnaire (MPDQ). PLoS ONE 2018. http://dx.doi.org/10.1371/journal.pone.0197562.
[9] Craparo G, Internet addiction. dissociation, and alexithymia. Procedia - Social and Behavioral Sciences 2011. http://dx.doi.org/10.1016/j.sbspro.2011.10.205.
[10] Dalbudak E, Evren C, Aldemir S, Coskun KS, Ugurlu H, Yildirim FG. Relationship of Internet Addiction Severity with Depression, Anxiety, and Alexithymia. Temperament and Character in University Students Cyberpsychology Behavior and Social Networking 2013. http://dx.doi.org/10.1089/cyber.2012.0390.
[11] De Berardis D, D'Albenzio A, Gambi F, Sepede G, Valchera A, Conti CM, et al. Alexithymia and Its Relationships with Dissociative Experiences and Internet Addiction in a Nonclinical Sample. CyberPsychology & Behavior 2009. http://dx.doi.org/10.1089/cpb.2008.0108.
[12] Evren C, Sar V, Evren B, Semiz U, Dalbudak E, Cakmak D. Dissociation and alexithymia among men with alcoholism. Psychiatr Clin Neurosci 2008. http://dx.doi.org/10.1111/j.1440-1819.2007.01775.x.
[13] Ghorbani F, Khosravani V, Sharifi Bastan F, Jamaati Ardakani R. The alexithymia, emotion regulation, emotion regulation difficulties, positive and negative affects, and suicidal risk in alcohol-dependent outpatients. Psychiatry Res 2017. http://dx.doi.org/10.1016/j.psychres.2017.03.005.
[14] Griffith JL. Disorders of Affect Regulation: Alexithymia in Medical and Psychiatric Illness. Psychosomatics 2011. http://dx.doi.org/10.1016/s0033-3182(98)71291-5.
[15] Gross JJ, John OP. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. J Personal Soc Psychol 2003.
[16] Ko CH, Yen JY, Yen CF, Chen CS, Chen CC. The association between Internet addiction and psychiatric disorder: a review of the literature. Eur Psychiatry 2012. http://dx.doi.org/10.1016/j.eurpsy.2010.04.011.
[17] Kuss D, Griffiths M, Karila L, Billieux J, Internet Addiction:. A Systematic Review of Epidemiological Research for the Last Decade. Current Pharmaceutical Design 2014. http://dx.doi.org/10.2174/1381612813199990617.
[18] Lam LT, Peng Z, Mai J, Jing J. Factors Associated with Internet Addiction among Adolescents. CyberPsychology & Behavior 2009. http://dx.doi.org/10.1089/cpb.2009.0036.
[19] Leung L, Lee PSN. Impact of Internet Literacy, Internet Addiction Symptoms, and Internet Activities on Academic Performance. Soc Sci Comput Rev 2012. http://dx.doi.org/10.1177/0894439311435217.
[20] Lin MP, Ko HC, Wu JYW. Prevalence and Psychosocial Risk Factors Associated with Internet Addiction in a Nationally Representative Sample of College Students in Taiwan. Cyberpsychology. Behav Soc Network 2011. http://dx.doi.org/10.1089/cyber.2010.0574.
[21] Loas G, Fremaux D, Otmani O, Lecercle C, Delahousse J. Is alexithymia a negative factor for maintaining abstinence?. A follow- up study. Compr Psychiatry 1997. http://dx.doi.org/10.1016/S0010-440X(97)90063-8.
[22] Loas G, Speranza M, Pham-Scottez A, Perez-Diaz F, Corcos M. Alexithymia in adolescents with borderline personality disorder. J Psychosom Res 2012. http://dx.doi.org/10.1016/j.jpsychores.2011.11.006.
[23] Lyvers M, Karantonis J, Edwards MS, Thorberg FA. Traits associated with internet addiction in young adults: potential risk factors. Addict Behav Rep 2016. http://dx.doi.org/10.1016/j.abrep.2016.04.001.
[24] Madden M, Lenhart A, Duggan M, Cortesi S, Gasser U. Teens and Technology 2013. Pew Research Center's Internet & American Life Project: Washington, DC; 2013 [https://doi.org/July 7, 2013].
[25] Mahapatra A, Sharma P. Association of Internet addiction and alexithymia – A scoping review. Addictive Behaviors 2018. http://dx.doi.org/10.1016/j.addbeh.2018.02.004.
[26] McKenna KYA, Bargh JA. Plan 9 from cyberspace: the implications of the internet for personality and social psychology. Personal Soc Psychol Rev 2000. http://dx.doi.org/10.1207/S15327957PSPR0401_6.
[27] Meganck R, Markey S, Vanheule S. Reliability and factor structure in an adolescent sample of the Dutch 20-item Toronto Alexithymia Scale. Psychological Reports 2012. http://dx.doi.org/10.2466/02.08.15.pr0.111.5.393-404.
[28] MohammadReza M, Amir T, Davoud B, Elahe Y, Horei K, Gholamreza A. Prevalence of Internet Addiction and its relationship with anxiety, stress, and depression in intermediate students in Birjand city in 2014 (In Persian). J Birjand Univ Med Sci 2015;22(1.).
[29] Nalwa K, Anand AP. Internet addiction in students: a cause of concern. Cyberpsychol Behav 2004. http://dx.doi.org/10.1089/109493103322725441.
[30] Ostovar S, Allahyar N, Aminpoor H, Moafian F, Nor MBM, Griffiths MD. Internet Addiction and its Psychosocial Risks (Depression, Anxiety, Stress and Loneliness) among Iranian Adolescents and Young Adults: A Structural Equation Model in a Cross-Sectional Study. Int J Ment Health Addict 2016. http://dx.doi.org/10.1007/s11469-015-9628-0.
[31] Ozturk FO, Ekinci M, Ozturk O, Canan F. The Relationship of Affective Temperament and Emotional-Behavioral Difficulties to Internet Addiction in Turkish Teenagers. ISRN Psychiatry 2013. http://dx.doi.org/10.1155/2013/961734.

[32] Parker JD, Taylor GJ, Bagby RM. The 20-Item Toronto Alexithymia Scale. J Psychosom Res 2003. http://dx.doi.org/10.1016/s0022-3999(02)00578-0.
[33] Parker JDA, Wood LM, Bond BJ, Shaughnessy P. Alexithymia in young adulthood: A risk factor for pathological gambling. Psychotherap Psychosom 2005. http://dx.doi.org/10.1159/000082027.
[34] Pinard L, Negrete JC, Annable L, Audet N. Alexithymia in Substance Abusers: Persistence and Correlates of Variance. Am J Addict 2009. http://dx.doi.org/10.3109/10550499608995654.
[35] Poli R. Internet addiction update: diagnostic criteria, assessment and prevalence. Neuropsychiatry 2017. http://dx.doi.org/10.4172/neuropsychiatry.1000171.
[36] Säkkinen P, Kaltiala-Heino R, Ranta K, Haataja R, Joukamaa M. Psychometric Properties of the 20-Item Toronto Alexithymia Scale and Prevalence of Alexithymia in a Finnish Adolescent Population. Psychosomatics 2007. http://dx.doi.org/10.1176/appi.psy.48.2.154.
[37] Scimeca G, Bruno A, Cava L, Pandolfo G, Muscatello MRA, Zoccali R. The Relationship between Alexithymia, Anxiety, Depression, and Internet Addiction Severity in a Sample of Italian High School Students. Sci World J 2014;2014:504376. http://dx.doi.org/10.1155/2014/504376.
[38] Shek DTL, Tang VMY, Lo CY. Internet addiction in Chinese adolescents in Hong Kong: assessment, profiles, and psychosocial correlates. Sci World J 2008. http://dx.doi.org/10.1100/tsw.2008.104.
[39] Spence S, Courbasson C. The role of emotional dysregulation in concurrent eating disorders and substance use disorders. Eating Behav 2012. http://dx.doi.org/10.1016/j.eatbeh.2012.05.006.
[40] Sung J, Lee J, Noh HM, Park YS, Ahn EJ. Associations between the risk of internet addiction and problem behaviors among Korean adolescents. Kor J Fam Med 2013. http://dx.doi.org/10.4082/kjfm.2013.34.2.115.
[41] Taylor GJ, Alexithymia:. Concept, measurement, and implications for treatment. Am J Psychiatr 1984. http://dx.doi.org/10.1176/ajp.141.6.725.
[42] Taylor Graeme J, Parker JDA, Bagby RM, Bourke MP. Relationships between alexithymia and psychological characteristics associated with eating disorders. J Psychosom Res 1996. http://dx.doi.org/10.1016/S0022-3999(96)00224-3.
[43] Toneatto T, Lecce J, Bagby M. Alexithymia and pathological gambling. J Addict Dis 2009. http://dx.doi.org/10.1080/10550880903014775.
[44] Watson D, Clark LA. Negative affectivity: the disposition to experience aversive emotional states. Psychol Bull 1984. http://dx.doi.org/10.1037/0033-2909.96.3.465.
[45] Xin M, Xing J, Pengfei W, Houru L, Mengcheng W, Hong Z. Online activities, prevalence of Internet addiction and risk factors related to family and school among adolescents in China. Addict Behav Rep 2018. http://dx.doi.org/10.1016/j.abrep.2017.10.003.
[46] Yates TM, Gregor MA, Haviland MG. Child Maltreatment, Alexithymia, and Problematic Internet Use in Young Adulthood. Cyberpsychol Behav Soc Network 2012. http://dx.doi.org/10.1089/cyber.2011.0427.
[47] Young KS, Internet Addiction:. The Emergence of a New Clinical Disorder. CyberPsychol Behav 1998;1. http://dx.doi.org/10.1089/cpb.1998.1.237.
[48] Zeeck A, Stelzer N, Linster HW, Joos A, Hartmann A. Emotion and eating in binge eating disorder and obesity. Eur Eating Dis Rev 2011. http://dx.doi.org/10.1002/erv.1066.